THE DOE GROUNDWATER STRATEGY

A MANAGEMENT APPROACH TO THE GROUNDWATER ISSUE

CONSERVATION AND PROTECTION

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PREFACE

This groundwater strategy presents an overview of the groundwater issue in Canada; summarizes the relevant policy and strategic framework; describes the general features of the solutions proposed; puts forth six Major Recommendations and outlines required actions and associated costs.

Detailed analysis of the issue, the rationale for the recommendations and suggested guidelines for implementing the proposed actions are contained in the companion Background Document.

Copies of both documents are available from:

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PURPOSE

The purpose of this strategy is two-fold:

1. To define a DOE and federal response to the "groundwater issue" in Canada.

2. To define the actions required to discharge the commitments made in the Federal Water Policy relating to groundwater.

INTRODUCTION

Contemporary thinking about the environment and about environmental issues, such as the concepts of "sustainable development," "integrated management" and "the ecosystem approach," dictate that no single environmental issue - such as groundwater contamination - can be addressed in isolation. Groundwater contamination cannot be addressed separately from the larger issue of groundwater management; groundwater concerns cannot be dealt with outside the context of the hydrologic cycle as a whole; the hydrologic cycle cannot be considered separately from the other physical, chemical and biological systems, which together comprise the ecosystem in which we live.

Similarly, jurisdictional issues - such as what is "federal" and what is "provincial" - have become much less relevant as we have begun to realize that the consequences of any action taken by any level of government or any segment, group or even individual members of society manifest themselves across all sectors and do not respect political boundaries. For example, the use of (federally regulated) agricultural chemicals does not just affect the agricultural community; the impacts may be felt (through contamination of provincially managed groundwater) in the areas of human health, wildlife conservation, regional economic development, and so on. Federal regulations concerning fish habitat may have enormous impacts on the forestry and mining industries, which are largely regulated by the provinces. Federal promotion of energy-saving technologies such as ground source heat pumps may significantly affect municipal water supplies - a provincial responsibility.

The need to deal with environmental problems in all their dimensions is daunting; indeed, it may never be possible to address such concerns in a truly global way. Within the present structure of governments and government departments, it would be counterproductive to attempt to devise strategies that are too comprehensive in scope.

Nevertheless, in today's social climate, it is mandatory to take as broad an approach as possible while keeping within the bounds of what is bureaucratically feasible.

The scope of this strategy has therefore been defined as follows:

- In terms of subject matter, it focuses on groundwater, and in particular, on groundwater management;

- In terms of jurisdiction, the strategy encompasses a cooperative federal/provincial, interdepartmental approach;

- In terms of societal concerns, it addresses social, environmental and economic issues.

At the same time, the groundwater strategy attempts to be consistent with overall federal and departmental policy directions and strategies in other areas, e.g., sustainable development, surface water, wildlife, wetlands conservation, economic development, etc. Undoubtedly, it will fail to do so in some areas, if only because federal and departmental legislation and policies are themselves inconsistent in many respects. This situation will no doubt be remedied in the course of time but it will be a long process. Environment Canada, however, cannot afford to wait any longer before implementing urgently needed groundwater strategies.

THE PROBLEM

Groundwater contamination is a major environmental issue of today. The potential costs to Canadians of dealing with known cases of groundwater contamination are of the order of several billion dollars, with the prospect that this figure will increase substantially as new cases come to light. In economic terms alone, groundwater contamination is comparable to other serious environmental and water management issues such as flooding or contamination of the Great Lakes.

Groundwater contamination has emerged as a leading environmental concern as a result of:

1) Increased public and political concern over environmental issues;

2) Growing demands for water supplies, including groundwater;

3) Past inadequate and improper practices on the part of the industrial, agricultural, municipal and domestic sectors of Canadian society;

4) Serious undervaluation of the worth of groundwater to Canadians in social, environmental and economic terms;

5) Inadequate and ineffective management of both the environmental and the resource aspects of groundwater by all levels of government in Canada;

6) The adoption of a short-term, firefighting approach to the issue rather than the development of a long-term management strategy.

THE POLICY

The Federal Water Policy provides the basic directions for the federal government's groundwater programs. It expresses an explicit federal government commitment "to the preservation and enhancement of the groundwater resource for the beneficial use of present and future generations." A framework to guide the Department in its program activities with respect to this commitment is part of the policy statement. It states that the federal government will:

- Develop, with provincial governments and other interested parties, appropriate strategies, national guidelines and activities for groundwater assessment and protection.

- Conduct research and undertake technological development and demonstration projects in response to groundwater problems.

- Develop exemplary groundwater management practices involving federal lands, responsibilities, facilities, and federally funded projects.

- Develop measures to achieve appropriate groundwater quality in transboundary waters.

- Provide information and advice on groundwater issues of federal and national interest.

THE STRATEGY

The courses of action adopted by Environment Canada for dealing with groundwater must be consistent with and an integral part of its actions and policies for dealing with surface water issues, toxic chemicals and land use practices. They must:

- Simultaneously encompass both quantity and quality concerns.

- Emphasize prevention of future groundwater contamination in addition to solving existing problems. Even though some existing contamination problems will have to be addressed because of overriding health or other concerns, these short-term issues must not override the longer term (and more crucial) concern with prevention.

- Provide for close, cooperative arrangements with the provinces and the private sector.

- Recognize the interconnectedness of all parts of the hydrologic cycle and of the ecosystems in which water plays a vital role.

- Recognize the legitimacy of the development-oriented mandates of other federal departments concerned with groundwater while stimulating their recognition of the importance of DOE's environmentally oriented objectives.

- Draw upon the capabilities of the academic and private sectors in achieving federal objectives while not impeding their capability to pursue their own goals.

The actions must be consistent with the policy directions established by the Federal Water Policy, other federal policies concerning issues such as Wetlands Conservation, the Inland Waters Directorate (IWD) Strategic Plan and by the Green Plan exercise, which all fundamentally express the concept of "sustainable development."

THE SOLUTIONS

The solutions proposed feature:

1) A joint five-year cooperative federal-provincial approach, involving many different departments at both levels of government;

2) A management approach based on the concept of sustainable development, emphasizing economic incentives, prevention rather than cleanup, and integration with other resource management issues;

3) A re-assessment of the value of groundwater to Canadians in social, environmental and economic terms;

4) Increased involvement of the university and private sectors in addressing groundwater issues;

5) Improved scientific and technical training to increase the level of groundwater expertise available to governments and the private sector;

6) Proposals for a "Baseline" level of activity, which involves essentially no increased costs to the Department, and for an "Enriched" program, which would require additional resources to yield optimum benefits.

The "Baseline" program could be implemented without new resources; the "Enriched" program would require 19 PYs and $2.7 million additional resources for the first year, rising to 54 PYs and $4.6 million in the last year of the five-year program. This is roughly equivalent to doubling the present size of DOE's groundwater program. In comparative terms the proposed increases would restore the level of hydrogeological research activities to what it was around 1980 and would establish a significant operational capability which DOE has not before possessed. These figures include only a part of the Canada Water Act budget or other resources that may be committed to federal/provincial agreements.

Implementation of the proposed strategy envisages:

1) Consultation with other federal departments and agreement on a federal groundwater strategy, based on the proposals in this document and the Background Document;

2) Submission of a Memorandum to Cabinet seeking approval of the proposed federal strategy and presenting options ranging from the Baseline program (no new resources) to the Enriched program;

3) Upon Cabinet approval, consultation and negotiation with the provinces, initially through CCME and subsequently on a province by province basis to develop cost-shared federal-provincial agreements to implement the federal strategy.

THE RECOMMENDATIONS

The Background Document makes 24 specific recommendations relating to the implementation of the Federal Groundwater Strategy. These have been condensed and combined into the following six Major Recommendations.

1. Coordination

DOE should exercise its leadership role in federal groundwater activities by appointing a full-time Chairperson to coordinate DOE and the federal government groundwater program. The Chairperson should also be DOE's primary contact person for groundwater matters with the provinces.

Background Document Recommendations (BDR) 3,4

2. Federal Responsibilities

The capability of DOE and the federal government to undertake their legitimate operational groundwater programs and projects should be significantly upgraded. Reviews of the capability of federal departments to respond to real-world requirements should be undertaken immediately, especially in the areas of data collection, technology transfer and technical training. Federal groundwater management plans should be developed and put in place immediately. These actions should take into account both existing responsibilities and new responsibilities deriving from CEPA and new environmental assessment legislation. Major new PY and financial resources should be allocated to DOE's operational groundwater programs.

BDR 6,7,8,16,22

3. Federal/Provincial Cooperation

The federal government, through DOE, should approach the provinces with the aim of developing, on a cooperative, cost-shared basis, compatible groundwater management systems, to be in place in five years. Such systems would deal with environmental, social and economic aspects of groundwater issues and would include the development of Guidelines for various groundwater-related activities and practices, creation of data banks, establishment of management strategies including the use of economic instruments and other management tools.

BDR 1,2,5,9,10,21

4. Research, Development and Demonstration

The federal government's access to high quality groundwater expertise, both in-house and extramurally, should be significantly improved. This should be accomplished by improvement of interdepartmental and intradepartmental coordination of research programs; initiation of Research, Development and Demonstration in hitherto neglected fields; allocation of significant new PY and financial resources for in-house R,D and D; financial assistance to universities in the establishment of new groundwater research faculty positions; establishment of a groundwater research grants program.

BDR 11,12,17,18,19,20

5. Socio-economic Activities

The federal government, and DOE in particular, should place greatly increased emphasis on the social and economic dimensions of its groundwater programs. These include establishing the true costs of existing and future groundwater contamination in social, economic and environmental terms; the

social, economic and environmental value of groundwater; the net costs and benefits of engaging in cleanup activities; and future demands on the groundwater resource. DOE's capability to undertake this work, either in-house or externally, should be assessed.

BDR 13,14,15,23

6. Public Information and Education

The federal government, and DOE in particular, should place increased emphasis on groundwater in its public water information and education programs. The importance of both the environmental and resource aspects of groundwater to Canadians should be more adequately reflected in ongoing public information programs.

BDR 24

THE ACTION PLANS

GROUNDWATER ACTION PLAN

DOE ACTIONS

	Action #	Action	Timing	Recommendation(s)	Notes
Coordination	1.	Establish Working Group; Appoint Chairperson.	Immediate	1	No new resources needed.
Reviews	2.	Review DOE operational groundwater capabilities, technology transfer mechanisms and socio-economic capabilities in groundwater.	Immediate start, Reports in 1 year.	2, 5	No new resources needed.
	3.	Review DOE Groundwater Data Collection Policies.	Immediate start, Report in 1 year.	2	No new resources needed.
Strategy/Guidelines Development	4.	Develop Strategies/Guidelines in Selected Areas; hire hydrogeologist to do so.	Hire hydrogeologist immediately. Guideline Development years 1 to 5.	3	PY for hydrogeologist is top priority. However, guidelines in some areas (e.g. orphan sites) can be started immediately.
Research, Development and Demonstration	5.	Establish Groundwater Development Technology Program.	Years 1 to 5	4	Office studies only in year 1. Level of effort in years 2-5 depends on availability of new financial resources.
	6.	Establish 4 to 5 University Faculty positions in Groundwater (with NSERC).	Years 1 to 5	4	Timing is uncertain as it depends on universities' interests and priorities, as well as on availability of funding.
	7.	Reinstate WRRSP.	Immediate	4	Entirely dependent on new funding.
	8.	Increase internal R, D and D.	Phased increase.	4	Entirely dependent on new PY and $ resources.
Manage Federal Responsibilities	9.	Increase DOE Operational Groundwater Capability.	Phased increase.	2	Some of needed PYs may be obtained by reallocation. Most will have to come from new resources.
	10.	Establish Value of Groundwater on National Scale, Indirect Costs of Contaminated Groundwater, and Future Demands for Groundwater.	Value/Cost studies in year 1; Demand studies in year 2.	5	Preliminary studies can be funded with existing allocations. New resources will be needed for full study.
Advice on Federal/National Issues	11.	Increase emphasis on Groundwater in Communications Programs.	Immediate start, Continuing.	6	Much can be done by redirection of existing programs. Special information items, e.g., videos, will require new resources.

GROUNDWATER ACTION PLAN

INTERDEPARTMENTAL ACTIONS

	Action #	Action	Timing	Recommendation	Notes
Coordination	1.	Appoint Working Group Chairperson as Groundwater contact point for ICW and CCME.	Immediate	1	No new resources needed.
Reviews	2.	Federal departments review/ reallocate resources allotted to groundwater programs.	Immediate	2	No new resources needed.
Strategy/Guidelines/ Development	3.	Establish federal Guidelines/Strategies in selected areas.	Years 1 to 5	3	To be coordinated through ICW or equivalent.
Research, Development and Demonstration	4.	DOE, Agriculture and EMR develop and sign agreements for joint research.	1 year	4	No new resources needed for development of agreements. Joint research studies may need new resources provided for in DOE Action #8.
Manage Federal Responsibilities	5.	Develop groundwater management plans for federal responsibilities.	years 1 - 5	2	To be coordinated through ICW or equivalent.

GROUNDWATER ACTION PLAN

FEDERAL/PROVINCIAL ACTIONS

	Action #	Action	Timing	Recommendation(s)	Notes
Coordination	1.	Establish federal/provincial coordinating mechanisms.	Immediate	1	No new resources needed. Can build on existing federal/provincial mechanisms.
Strategy/Guidelines/ Development	2.	Establish federal and provincial groundwater management systems and mechanisms for protection/remediation and resource management.	Years 1 to 5	3	
	3.	Develop coordinated data banks and national guidelines/strategies in selected areas. a) Establish plan b) Implement	 Year 1 Years 2 - 5	3	This activity is under way using existing resource allocations. New resources will be required later.
	4.	Establish the value of groundwater, the indirect costs of groundwater contamination, and future groundwater demands on a regional/provincial scale.	Years 1 to 5	5	Preliminary studies can be funded with existing resources. New resources will be needed for a full study.

THE COSTS

SUMMARY OF NEW RESOURCE REQUIREMENTS

FOR ENRICHED PROGRAM

Rec. No.	Recommendation	Year 1 py	Year 1 K$	Year 2 py	Year 2 K$	Year 3 py	Year 3 K$	Year 4 py	Year 4 K$	Year 5 py	Year 5 K$
1.	Coordination	2	150	2	150	2	150	2	150	2	150
2.	Federal Responsibilities	10	500	20	1000	25	1250	25	1250	25	1250
3.	Fed/Prov Cooperation	2	220	2	270	2	270	2	270	2	270
4.	RD&D	5	1700	10	1980	15	2250	20	2530	25	2800
5.	Socio-Econ. Studies	-	50	-	50	-	50	-	50	-	50
6.	Public Info./Edn.	-	45	-	45	-	45	-	45	-	45
	TOTALS	19	2665	34	3495	44	4015	49	4295	54	4565